

Archidoris odhneri (MACFARLAND, 1966) comb. nov.,
With some Comments on the Species of the Genus
on the Pacific Coast of North America

BY

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IN HIS MAGNIFICENT memorial volume on the Opisthobranchia of the Pacific Coast of North America (1966), the late FRANK MACE MACFARLAND introduced many new species with minutely detailed descriptions and beautifully executed plates, both in colour and pen and wash. The validity and synonymy of the new species is a desideratum for students of the opisthobranch molluscs the world over and remains an important task for competent Pacific Coast researchers. In some instances, the generic placement of species is open to question. The present contribution, though very short, presents the case for the generic transfer of one species.

Within the large family Dorididae, often the only criteria for generic separation are found in differences of the reproductive systems. Thus, genera have been founded upon the armature or its absence in the male and female ducts, the presence of a prostate gland whether discrete, a mere dilation or its absence, and the formation of the spermatheca and spermatocyst in their modes of attachment to the vagina and uterine duct and in their relationship to one another. In the subfamily Doridinae (ODHNER, 1939: 26, 27; = Doridinae plus Archidoridinae of ODHNER, 1926: 54), the external and pharyngeal differences between some genera are so slight that only careful examination of the reproductive organs can indicate the true generic position. Thus in the following text, considerable emphasis is placed on the various parts of the reproductive organs.

Austrodooris odhneri MACFARLAND, 1966 (173-179; plt. 26; plt. 29, fig. 14; plt. 36, figs. 1-19) is a large apparently rare dorid from the Monterey Bay region of California. MACFARLAND (pp. 171-173) gave a generic definition, noted that his species was the first of the genus from the northern hemisphere, and tabled the valid and reputed species of the genus. The writer has recently examined 3 species of *Austrodooris* from Austral-

ian Antarctica as well as 2 species of *Archidoris* from New Zealand and Heard Island (an Australian dependency in the subantarctic Indian Ocean), during which time a survey of the literature of these 2 genera was made.

Austrodooris ODHNER, 1926 (p. 55) is defined as having (1) the winding vas deferens of uniform diameter without prostate gland or prostatic section, and enclosed within a tough leathery sheath for its whole length, (2) no penis or penial armature, and (3) the spermatheca and spermatocyst in vaginal combination. Almost all knowledge of *Austrodooris* is contained in two papers (ODHNER, 1926, 1934) where good figures of the reproductive systems of various species are given.

Study of MACFARLAND's figure (1966: plt. 36, fig. 7) shows that *Austrodooris odhneri* has (1) the vas deferens at first wider and coiled, then much narrower and winding tortuously within a long broad sheath of fibrous tissue, (2) the former terminating in a low wide penial papilla, and (3) the spermatheca and spermatocyst in semiserial combination.

As these reproductive differences are of generic value, *Austrodooris odhneri* cannot be maintained in *Austrodooris*.

However, this species does closely resemble *Archidoris wellingtonensis* (ABRAHAM, 1877, p. 259) from New Zealand in which (1) the vas deferens is at first narrow and neatly coiled in a glomerate mass, then wider and straighter as it passes through the long broad sheath of fibrous tissue, (2) there is a low wide penial papilla, and (3) the spermatheca and spermatocyst are in semiserial combination. Hence the writer believes *Austrodooris odhneri* and *Archidoris wellingtonensis* to be congeneric and the former to belong to *Archidoris* BERGH, 1878, where it will be known by the new combination *Archidoris odhneri* (MACFARLAND, 1966).

On the other hand, the reproductive system of *Archidoris montereyensis* (COOPER, 1862) (MACFARLAND, 1966, p. 181), a common species of the Pacific Coast from Alaska to San Diego (STEINBERG, 1963: 70), differs considerably from *A. odhneri* in that there is a very distinctive digitiform penis and the spermatheca and spermatocyst, while still semiserally combined, lie very close together. These reproductive characteristics are also present in specimens of *A. kerguelensis* BERGH, 1884 (p. 85) from Heard Island. It seems therefore that a re-appraisal of generic and subgeneric units is necessary for these species of *Archidoris*, but this must await comparative examinations with specimens of the type species of the genus, *Archidoris tuberculata* (CUVIER, 1804).

Furthermore, it should be pointed out that MARCUS, 1961 (p. 16) appears to have confused *Archidoris odhneri* and *Archidoris montereyensis*. His figure of the reproductive system (plt. 3, fig. 55) suggests by the spacing of the spermatheca and spermatocyst and the absence of a distinct penis that he examined small specimens of *Archidoris odhneri*.

Two other species of *Archidoris* are reported from the Pacific Coast of North America. The first is *A. tuberculata* (CUVIER, 1804) to which there are but two references. In the "Albatross" report on the dredgings along and off the American west coasts, BERGH (1894: 158) gives a brief description of some Atlantic specimens of *A. tuberculata*, and in a separate paragraph (p. 159) records a single specimen from off La Paz, Baja California (24°11' N, 109°55' W) in 10 fathoms. It was somewhat like *A. montereyensis* in colour and shape of the radular teeth though these were rather more numerous in number of rows and teeth per half row (formula 56 x 84:0:84). This specimen was 21 mm long, 14 mm broad and 9 mm high. BERGH was quite familiar with *A. tuberculata* from European and eastern Atlantic waters with its distinctive patterning of larger tubercles set among more numerous smaller tubercles (ALDER & HANCOCK, 1854; Family 1, plt. 3, figs. 1-2, 6). As this specimen had a radular formula within the range of that species, he no doubt considered it identical. O'DONOGHUE (1926, p. 207) recorded this specimen as *Archidoris britannica* (JOHNSTON, 1838).

Shortly afterwards, BERGH (1900: 221) recorded a smaller specimen from Bare Island (between Vancouver Island and the Canadian mainland) which he also identified with *Archidoris tuberculata*. It was only 13 mm long, 8 mm broad and 4 mm high with the radular formula 29 x 37:0:37. In this specimen the number of teeth per row is half that of European specimens, hence the identification must be regarded as rather uncertain.

Zoogeographically, it is possible that *Archidoris tuberculata* should occur on both coasts of North America. Already there are several nudibranch species with this distribution, viz. *Aeolidia papillosa* (LINNAEUS, 1761), *Onchidoris bilamellata* (LINNAEUS, 1767), *Dendronotus frondosus* (ASCANIUS, 1774) (MARCUS, 1961: 56-57). These 3 species also occur in Hokkaido, northern Japan (BABA, 1957) and *A. tuberculata* is recorded from far eastern Russian seas (VOLODSCHENKO, 1941: 60; 1955: p. 183; plt. 48, fig. 5).

ABRAHAM's specimens from Vancouver Island, listed as *Doris tuberculata* (1877: 198), were examined by O'DONOGHUE (1926: 206, footnote) who found them to be identical with *Archidoris montereyensis*.

The last species of *Archidoris* is *A. nyctea* BERGH, 1900 (p. 222) from Bare Island. It is known only from a single 50 mm long specimen with small (2 mm diameter) and smaller rounded tubercles and 8 branchiae. The radula of 37 x 700:70 is both very close in formula and shape of teeth to *A. montereyensis*. Similarly, the reproductive organs with the vas deferens coiled into a twisted mass and the semiserial spermatheca and spermatocyst each with a long duct, are very close to *A. montereyensis* (MACFARLAND, 1966: 182; plt. 37, figs. 9, 10). BERGH appears not to have examined *A. montereyensis* in detail (1878: 624; 1879: 107) except for the radula, hence when confronted with reasonably fresh material in which a spurious rhachidian tooth occurred, he preferred to create a new species instead of referring it to the former. Until it can be shown otherwise, the writer believes that *A. nyctea* should be maintained among the synonymy of *A. montereyensis*. O'DONOGHUE (1921: 154; 1926: 206) does not mention *A. nyctea* as a separate species nor list it among the synonymy of any other species.

To summarize, there are four points:

1. Study of various figures of reproductive systems show that *Austrodoris odhneri* MACFARLAND, 1966 is untenable in that genus and must be transferred to *Archidoris* in the new combination *Archidoris odhneri* (MACFARLAND, 1966).
2. Three species of *Archidoris* occur on the Pacific Coast of North America: *A. montereyensis* (COOPER, 1862) with low bluntly conical small tubercles of uniform size is widespread and common; *A. odhneri* (MACFARLAND, 1966) with low large and small tubercles is rarer and probably often confused with the first; and *A. tuberculata* (CUVIER, 1804) with larger tubercles set in a field of smaller tubercles is reported from 2 internally differing specimens.
3. *Archidoris nyctea* BERGH, 1900 is most probably a junior synonym of *A. montereyensis*; its only distinction is a spurious rhachidian in the radula.

4. *Archidoris tuberculata* from Baja California and Bare Island needs to be re-discovered and compared directly with European specimens. The Bare Island specimen may be only a small *A. montereyensis* with somewhat reduced radula; that from Baja California may represent an extralimital southern form of the same species in which the radula has evolved a greater number of teeth.

LITERATURE CITED

- ABRAHAM, P.
1877. Revision of the anthobranchiate nudibranchiate Mollusca. Proc. Zool. Soc. London 1877: 196-269; pls. 27 to 30 (August 1877)
- ALDER, JOSHUA, & ALBANY HANCOCK
1845-1855. A monograph of the British nudibranchiate mollusca 1845. Ray. Soc., pts. 1-7.
- BABA, KIKUTARŌ
1957. A revised list of the species of Opisthobranchia from the northern part of Japan. Journ. Fac. Sci. Hokkaido Univ. 6, Zool. 13 (1-4): 8-14
- BERGH, LUDWIG SOPHUS RUDOLF
1878. Malacologische Untersuchungen. In C. SEMPER, Reisen im Archipel der Philippinen 2 (14): 603-645; pls. 66-68
1879. On the nudibranchiate gastropod mollusca of the north Pacific ocean, with special reference to those of Alaska. Proc. Acad. Nat. Sci. Philadelphia, pt. 1: 71-132; pls. 1-8.
1884. Report on the Nudibranchiata. Rep. Sci. Results Challenger Exped. 10: 1-154; pls. 1-14
1894. Reports on the dredging operations off the west coast of central America to the Galapagos, to the west coast of Mexico and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. Fish Commission steamer "Albatross", during 1891. XIII. Die Opisthobranchien. Bull. Mus. Comp. Zool., Harvard Univ. 25 (10): 125-233; pls. 1-12 (October 1894)
1900. Ergebnisse einer Reise nach dem Pacific. Zool. Jahrb., Abt. Syst. 13: 207-246; pls. 19-21
- MACFARLAND, FRANK MACE
1966. Studies of opisthobranchiate mollusks of the Pacific Coast of North America. Mem. Calif. Acad. Sci. 6: xvi + 546 pp.; 72 pls. (8 April 1966)
- MARCUS, ERNST
1961. Opisthobranch mollusks from California. The Veliger 3 (Supplement, pt. 1): 1-85; pls. 1-10. (Feb. 1, 1961)
- ODHNER, NILS HJALMAR
1926. Die Opisthobranchien. in: Further Zoological Researches of the Swedish Antarctic Expedition 1901-1903, 2 (1): 1-100; pls. 1-3.
1934. The Nudibranchiata. In British Antarctic ("Terra Nova") Expedition, 1910. Nat. Hist. Rep. Zool. 7 (5): 229-310; pls. 1-3. London.
- O'DONOGHUE, CHARLES HENRY
1921. Nudibranchiate mollusca from the Vancouver Island region. Trans. Roy. Canad. Inst. 13 (1): 147-209; pls. 7-11
1926. A list of the nudibranchiate mollusca recorded from the Pacific coast of North America, with notes on their distribution. Trans. Roy. Canad. Inst. 15 (2): 199-247.
- STEINBERG, JOAN EMILY
1963. Notes on the opisthobranchs of the West Coast of North America - IV. A distributional list of opisthobranchs from Point Conception to Vancouver Island. The Veliger 6 (2): 68 to 73 (1 October 1963)
- VOLODCHENKO, N. I.
1941. New nudibranchiate mollusks from seas of the far east of the U. S. S. R. Invest. Far East. Seas U. S. S. R. 1: 53-68; pls. 1-4
1955. Atlas of the invertebrates of the eastern seas of Russia. Russian Acad. Sci. Moscow and Leningr. (Opisthobranchia: 181-185) 240 pp.; 66 pls.

